REMARKS

Applicants respectfully request reconsideration. Claims 1 and 3-11 were previously pending in this application. By this amendment, Applicants are amending claims 1 and 11. As a result, claims 1 and 3-11 are pending for examination with claims 1 and 11 being independent claims. No new matter has been added.

Support for the amendment of claims 1 and 11 may be found, *inter alia*, in the section of the detailed description on page 17, lines 8 to 19.

Summary of Telephone Interview with Examiner

Applicants' representatives conducted a telephone interview on January 8, 2007 with Examiner McDonald in connection with the above-referenced application.

During the interview, Applicants' representatives discussed the independent claims and the cited art. Applicants explained their position that there is no motivation to combine the teachings of Uchida et al. ("Application of Titania Nanotubes to a Dye-Sensitized Solar Cell," Electrochemistry, June 2002, Vol. 70, No 6, pages 418-420) with U.S. Patent No. 6,376,765 ("Wariishi") and U.S. Patent No. 6,586,670 ("Yoshikawa"), as described in the response to the previous Office Action.

Applicants further argued that the high photoelectric conversion achieved by the Applicants using titania nanotubes sensitized with dyes having no acidic substituents is an unexpected result, as described further below. Applicants further indicated that the independent claims might be amended to include a feature that the photoelectric transfer efficiency of the photoelectric transfer device is greater than about 10%. The Examiner indicated that such an argument and amendment would require further consideration and searching.

Rejections Under 35 U.S.C. §103

The Office Action rejected claims 1 and 3-11 under 35 U.S.C. §103(a) as supposedly being unpatentable over Uchida et al. ("Application of Titania Nanotubes to a Dye-Sensitized Solar Cell," Electrochemistry, June 2002, Vol. 70, No 6, pages 418-420) in view of U.S. Patent No. 6,376,765 ("Wariishi") and U.S. Patent No. 6,586,670 ("Yoshikawa"). Applicants respectfully disagree.

Applicants do not necessarily agree that there is proper motivation to combine the references, however, even if there the cited combination had proper motivation, the claims distinguish over the combination.

Claim 1, as amended, is directed to dye-sensitized photoelectric transfer device comprising a semiconductor layer containing titania nanotubes, and a sensitizing dye retained by the titania nanotubes, wherein the sensitizing dye has no acidic substituents and wherein a photoelectric transfer efficiency of the photoelectric transfer device is greater than about 10%.

Claim 11, as amended, is directed to a method of manufacturing a dye-sensitized photoelectric transfer device, comprising providing a semiconductor layer containing titania nanotubes, and retaining a sensitizing dye with the titania nanotubes, wherein the sensitizing dye has no acidic substituents and wherein a photoelectric transfer efficiency of the photoelectric transfer device is greater than about 10%.

Nowhere do the cited references teach that a photoelectric transfer efficiency of a photoelectric transfer device is greater than about 10% as recited in claims 1 and 11. Furthermore, nowhere do the cited references teach a sensitizing dye retained by titania nanotubes, wherein the sensitizing dye has no acidic substituents and wherein a photoelectric transfer efficiency of the photoelectric transfer device is greater than about 10%.

Yoshikawa may teach a photoelectric conversion efficiency of at most 7.3% using dye R-1 with semiconductor fine particles (Yoshikawa: col. 42, Table 5), but nowhere does Yoshikawa teach that the photoelectric conversion efficiency is greater than about 10%. Furthermore, nowhere does Yoshikawa teach a photoelectric conversion efficiency greater than about 10% using a sensitizing dye having no acidic substituents. Uchida, teaches that titania nanotubes sensitized with a ruthenium dye having an acidic substituent results in a solar cell having a conversion efficiency of only 2.9%, similar to that of titania nanopowder (Uchida: page 420, paragraphs 10-11). Based on the prior art presented, a photoelectric conversion efficiency of greater than about 10% for titania nanotubes is an unexpected result.

To show the extent of the unexpected results, Applicants point to Table 1 of the specification which presents the photoelectric transfer efficiency of *porous titania* and *titania nanotubes* sensitized with dyes having no acidic substituents (e.g., dyes ZnTPP and N) as compared to the

same materials sensitized with dyes having acidic substituents (e.g., dyes ZnTCPP and N3). For porous titania, the photoelectric conversion using dyes having no acidic substituents is unworkably low (e.g., 0.018% and 0.016%). In contrast, titania nanotubes exhibit unexpectedly high photoelectric transfer efficiency (e.g., 1.8% and 10.2%) when using sensitizing dyes having no acidic substituents. This should be contrasted with the cited prior art (Uchida) which would lead one of ordinary skill in the art to not expect such a high photoelectric transfer efficiency for titania nanotubes sensitized with dyes having no acidic substituents, as compared to porous titania sensitized with the same dyes.

Applicants have noted that the unexpected result is of significant practical advantage in the specification. Since there is no introduction of acidic substituents into the sensitizing dye, it is possible to suppress association of sensitizing dye particles, thereby alleviating the phenomenon of optical quenching of photo-excited electrons, and resulting in the efficient injection of excited electrons into the titania nanotubes (specification: page 10, line 25 – page 11, line 3). This advantage also contributes to enhancing the photoelectric transfer efficiency (specification: page 11, lines 3-5). In addition, no introduction of acidic substituents into the sensitizing dye simplifies the manufacturing process of the sensitizing dye and thereby contributes to a significant reduction in the manufacturing cost specification: page 11, line 6-10). Also, since the introduction of acidic substituents is removed, it is easy to use new sensitizing dyes, and the choice of sensitizing dyes is broadened (specification: page 11, line 10-14).

Claim 1 and 11 are therefore allowable for at least the above reasons.

Claims 3-10 depend from claim 1, and are allowable for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 1 and 3-11 under 35 U.S.C. §103 is respectfully requested.

CONCLUSION

In view of the above amendment, Applicants believe the pending application is in condition for allowance. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: January 17, 2007

Respectfully submitted,

By Randy J. Pritzker

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